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ABSTRACT

This paper asserts that the more enriching the interactions and experiences that parents and child caregivers provide to very young children, the more chances they are providing for growing neural connections and pathways in the brain to support language, reasoning, and planning skills; mental health and emotional well-being; and motor development. The paper discusses 20 ways for child care professionals to ensure optimal development of children's growing brains. Examples are: (1) be sure that the baby's brain before birth has a healthy start; (2) provide rich language inputs; (3) play simple body games; (4) make a picture book sharing a daily intimate activity; (5) share joint attention; (6) use diapering time to build babies' emotional feelings of having a "lovable body"; (7) provide developmentally appropriate toys; (8) respond promptly to infant distress signals; (9) nurture baby confidence; and (10) perform daily infant massage. (EV)

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Presentation at the annual NAEYC meetings, November 2002, New York City.

"TWENTY TIPS FOR GROWING A BABY'S BRAIN"

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At birth, a baby's brain contains 100 billion neurons (as many as the stars in the Milky Way!) and a trillion glial cells, that protect and nourish the neurons. But these neurons need to become wired together so that electrical and chemical messages flow easily across the synapses, which are the connections between one neuron and another.

During the first years, the baby's brain grows trillions of connections between neurons. Neuronal synapses that are not "wired together" are pruned and lost starting before 10 years. Indeed, mysteriously, a toddler's brain has twice as many neuronal connections as an adult's brain! These data suggest how important the early years are for teaching a child's brain to learn how to learn and to learn how to feel and act lovingly!

Neurologically, the baby's brain indeed and thankfully has some hard wiring. Lower areas of the brain, the medulla and the cerebellum, for example, take care of many wonderful activities, such as keeping our hearts and breathing going well and keeping us able to negotiate walking about steadily without staggering or falling as we move through living and learning spaces in our

lives.

The brain also has "hard wired in" the ability to learn any language. Researches have demonstrated that babies in all cultures have the awesome brain power and capability to hear and respond differentially to the differences among sounds from all the languages of the world! Yet by the end of the first year, babies only respond to those sounds that are in the language repertoire of the folks who are rearing the infant.

Thankfully, the brains of small children have far more plasticity than an adult brain. Thus, if there is, unfortunately, a trauma to the left side of a baby's brain, where language understanding and language production are lodged, that infant will probably still be able to acquire language, although a similar trauma to an adult's brain may well result in loss of ability either to understand or produce speech.

The more enriching the interactions and experiences that caregivers provide to very young children, the more chances they are providing for "growing" neural connections and pathways to support rich language, reasoning,and planning skills - the prime work of the frontal cortex.

Your interactions also promote mental health and emotional well-being by wiring in pleasurable and secure interactive and loving experiences, so that these experiences are registered positively in the wiring of the limbic area of the brain.

As you encourage sensory-motor experiences,such as dancing to music, handling art materials, play with different shapes.

sizes.and weights of toys, you will be ensuring enriched connections between sensory input areas and motoric connecting areas in the brain that send signals to muscles and help with the development of wonderful coordinations: for example,when a baby picks up a Cheerio with just thumb and forefinger, a toddler eyes the blocks he is handling and successfully piles smaller blocks on top of larger blocks so that his building stays up rather than toppling down, or when a preschooler rides off successfully on a tricycle and steers carefully along the path in the play yard.

Loving, engaged and reflective caregivers who take advantage of teachable moments and who are astute noticers of cues each little child gives them, will assist in wiring up all of these connections as primary teachers of a baby's brain!

Hone Your Skills as Primary Teachers of the Baby's Brain!

What can childcare professionals do to ensure optimal development of the growing brain?

1. Be sure that the baby's brain before birth has a healthy start. Drugs in utero critically destroy baby's brain for learning. FAS (Fetal Alcohol Syndrome) dooms thousands of children each year to retardation and ADHD. British studies reveal maternal cigarette smoking causes lower 4th grade reading scores. Post information on healthy pregnancies on the bulletin board in your childcare facility so that parents-to-be can see easy-to-read information about brain growth and healthy fetal

development. For families expecting a new baby, provide some free brochures about the effects of drugs on fetal brain development.

2. Brain areas for understanding speech and producing language need your rich inputs! Speak "parentese" talk with babies. Draw out the syllables of your words and use a delighted, high-pitched voice, and short phrases repeated slowly. Bursts of electrical activity flow through the brain neurons and wire the connections together as you engage in pleasurable turn-taking-talk with babies and treat their vocalizations as meaningful communications in leisurely language encounters. As your baby starts to produce first cooing sounds, and later in the first year babbles and long strings of "jargon" (duplicated syllables , such as "da,da,da"and then unreduplicated strings of varied syllables), be sure to respond with interested tones and talk that confirms for the baby how important her talking is!

3. Play simple body games (pat-a-cake, peek-a-boo, this little piggy goes to market) to engage babies in learning simple, sequential interactive activities as they engage in games.

4. Make picture book sharing a daily intimate activity. Relate pictures to baby's experience.Focus infant attention and prolong baby's attention span. Choose books with large colorful single pictures for infants under one year old. Embroider the story. Make up the story. Engage baby's delight in decoding the pictures! Choose interesting books and read daily with toddlers. Modulate your voice tone; simplify or elaborate on story lines; inspire toddlers to talk about books and want to

hear them read over and over. Foster an early passion for books. Wire in the brain connections between seeing (through the visual area in the occipital area of the brain) pictures and print, understanding and interpreting language (mediated by Wernicke's area in the brain) and the ability to produce intelligible speech and respond with talk about the story (mediated in the brain by Broca's area together with the motor cortex that is involved with coordination of tongue, lips, palate, larynx and other muscles that enter into speech production).

If possible, have a local librarian come and talk to your parent group meetings about appropriate books to read with babies and demonstrate "picture book sharing" in cozy ways. At your family meeting, maybe some family wants to have their stay-up-late baby be the model for how to sit in a snuggly close together way with a baby and participate in the joys of picture book sharing.

5. Share joint attention. When baby points, follow with your gaze and then remark on items or events of interest to baby.

6. Use diapering table time to build babies' emotional feelings of having a "lovable body" and for enhancing positive body image. Touch and stroke baby's tummy and hair. The brains of babies who are not touched and stroked often are 20-30% smaller than normal for their age.

7. Provide developmentally appropriate toys as "grist" for a baby's growing sense of being able to explore and act successfully on toys to make something interesting happen. Choose

toys such as a wind-up Jack in the box; blocks that can be stacked in a certain way; nesting cups; pegs that can be inserted into pegboards; simple puzzles of infant favorites, such as dogs, kitties, or monkeys, or TV characters such as Elmo. At first, choose puzzles with knobs that a baby can grasp easily, and that help baby learn "cause and effect" relationships. As baby problem- solves how to use these toys, "if-then" syllogistic reasoning understandings are wired in early! Choose carefully so the toys are not too easy and not too difficult, but just challenging enough to stimulate brain development.

8. Respond promptly to infant distress signals. Soothe, nurture, cuddle, and reassure so that you build positive emotional mental health as well as good brain circuits - especially for the amygdala and other parts of the limbic area of the brain - so that your planned experiences and intimate engagements signal emotional safety and security.

Watch carefully in your classroom for the child who may flinch rather than glow with pride as you reach out to caress his cheek and express pleasure in his new drawing or the block tower he has just finished building. That child may have built in brain circuits wired to respond trigger-fast to possible danger as an adult's hand approaches him. Children who have been physically punished will need all your persistent and tender efforts to rewire the brain areas that "remember" trauma! The hippocampus is the brain area which stores memories. You will have to help the hippocampal area learn new memories of intimate interactions with

an adult - you the loving caregiver!

9. Nurture baby confidence in your caregiving! Soothe, comfort, and provide genuine focused attention. Babies who are secure with you will invest their emotional energy in the pleasures of exploration, learning, and discovery (See Honig's 2002 NAEYC book: "Secure relationships.") Babies trusting in your care will be able to develop empathy for distressed others. Dr. Bruce Perry's research with abused/neglected children shows that babies who are scared or traumatized by chaotic rather than regular serene experiences show the three PTSD (Post Traumatic Stress Disorder) symptoms: freeze, flight, and fight. Threatening and chaotic experiences disrupt brain patterns in the limbic area, and result in an increased flow of stress hormones, such as norepinephrine and cortisol. This child may have trouble with impulse control and lash out at others. The young child who has been harshly treated will need a very long period of intimate loving interactions with trustable caregivers in order to "rewire" the brain so that new emotional pathways can be built that reflect trustfulness in adult ministrations rather than wariness, fear, anger, and terror.

10. Daily infant massage can decrease stress and enhance baby feelings of well being and emotional security. Dr. Tiffany Field's research shows that premature babies massaged three times daily grow better and are ready to leave the hospital days earlier than babies who are not massaged.

11. Set up a safe environment for crawling and toddling babies so that they can discover spatial parameters (such as under, over, inside, near) and wire in clearer understandings of their relationship to spaces. Wire up the sensory-motor connections of the brain by arranging safe spaces for exploration, so that young children learn how to move their bodies safely and gracefully in space and to negotiate spatial areas with confidence in their body coordinations and their sense of direction in choosing how to get from one area to another to engage in play.

12. Sing songs with babies. Choose songs with body motions and finger plays that help babies learn to integrate song sounds with motoric actions. Try: "This little piggy goes to market", "The wheels on the bus go round and round", "Ring around a rosy", and "Ten little monkeys jumping on the bed". Lullaby songs will soothe babies into sleep. Toddlers often like to make up "dances" to slow dreamy songs. If you provide props, such as large colorful nylon gauze to twirl with, toddlers may enjoy even more creating bodily graceful motions to music.

13. Rub backs at nap time. Use caressing strokes on backs, hair, and tummies to make intimate emotional contact and reassure babies of your loving attentiveness. Autopsy work at 24 months with babies who had died, has revealed that babies who had rarely been touched or played with had brains 20% smaller than the brains of babies who had been touched and caressed and played with. Caressing touch is a secret ingredient that helps to grow a

baby's brain!

14. Match your tempo for bodily care individually for each child. Tune into each child' temperamental style (whether easy/flexible, irritable/triggery, or slow-to warm up. Increase the shy child's courage and comfort. Help a highly active child safely use that wonderful energy while learning impulse control and how to modulate exuberant actions that may scare some peers.

15. Provide clear contingent responses to baby actions. Babies' brains learn to make "sense" of the world as you respond in predictable, reassuring, and appropriate ways to their behaviors. Promote "gut syllogisms" learning to help the cerebral cortex learn causality connections at body level long before the child could ever solve a math problem that involves causal reasoning, for example! The baby's brain learns" "If I cry, someone comes to comfort me." "If my tummy feels hungry, my special person brings me milk as soon as I signal her with my hunger cry."

16. Make mealtimes and rest times very positive for babies. Label foods. Express pleasure as infants learn to self feed, no matter how messy their initial attempts are. "Wire in" brain circuits that make eating and adult participation in meals positive experiences. Hold infants for bottle feedings.

17. Use positive discipline techniques. Teach consequences for inappropriate child actions without scaring, shaming,or frightening the child (See Honig's Behavior guidance book).

18.Model and encourage empathic feelings for others in every

possible way. Use"teachable moments" when a peer is upset to help babies learn about caring, sharing, and kindness.

19. Arrange supervised play with "messy" materials, such as water play, sand play, and even mud play in warm weather, to help infants and toddlers extend their understandings of the physics and chemistry of mixtures and textures, liquids and solids. Babies love the sensory pleasures of bath times!

20. Express joy and genuine interest in each baby. Let your body language, your shining eyes, your attentiveness to babbling and baby activities, your gentle caresses and smiles, validate the deeply lovable nature of each infant and toddler you cherish. You are the best builder of a smart and loving brain for each baby in your care!

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